

**ORDER**

6600.26A

**National Airspace Data Interchange Network (NADIN) II  
Program Implementation Plan**



**March 28, 1994**

**U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION**

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**Initiated By:**

ANC-400

## RECORD OF CHANGES

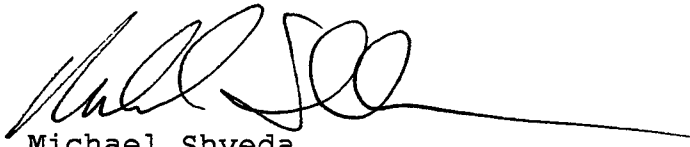
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**FOREWORD**

This order provides technical guidance and management direction for the orderly implementation of the National Airspace Data Interchange Network (NADIN) II Packet Switched Network (PSN). The procedures and responsibilities in this order were developed using current agency directives. This order establishes program management and project implementation policy and responsibilities governing the activities of organizations. It also identifies and describes specific events and activities to be accomplished in order to implement the NADIN II PSN. The format and content of this order are prepared as specified in FAA-STD-036, Preparation of Project Implementation Plans, and 1320.1D, FAA Directives System.



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## CHAPTER 1. GENERAL

1. **PURPOSE**. This order provides an updated Project Implementation Plan (PIP) for the National Airspace Data Interchange Network (NADIN) II Packet Switched Network (PSN) and presents overall technical guidance and management direction for the orderly implementation of the PSN equipment at the respective sites. The plan establishes program management and project implementation policy and responsibilities governing the activities of organizations. It also identifies and describes specific events and activities to be accomplished in order to implement the NADIN II PSN, and it provides high-level guidance for the preparation of site-specific implementation and transition plans. The format and content of this order are prepared as specified in FAA-STD-036, Preparation of Project Implementation Plans, and 1320.1D, FAA Directives System.

2. **DISTRIBUTION**. This order is being distributed at service level to NAS Transition and Implementation and Systems Maintenance; at division level to the Program Director for Communications and Aircraft Acquisition, Systems Maintenance, NAS Systems Engineering, Air Traffic Plans and Requirements, NAS Transition and Implementation, and Operational Support Services, the Office of Training and Higher Education and the Office of the Associate Administrator for Airway Facilities; at branch level to the regional Airway Facilities and Air Traffic divisions, the FAA Academy and FAA Logistics Center at the Mike Monroney Aeronautical Center, and the Engineering, Integration and Operational Evaluation Service and the Data Systems Communications Engineering Branch at the FAA Technical Center; and the standard distribution to all Airway Facilities field offices.

3. **CANCELLATION**. Order 6600.26, Project Implementation Plan for NADIN II PSN, dated November 29, 1990, is cancelled.

4. **DEFINITIONS**. The following acronyms and contractions are used in this order:

APM	Associate Program Manager
APMT	Associate Program Manager for Test
ARTCC	Air Route Traffic Control Center
AUX	Auxiliary
CAI	Contractor Acceptance Inspection
CCITT	International Telegraph and Telephone Consultative Committee
CDRL	Contract Data Requirements List
COTS	Commercial-off-the-shelf

CNS	Consolidated NOTAM System
DRR	Deployment Readiness Review
DTE	Data Terminal Equipment
DT&E	Development Test and Evaluation
E&R	Exchange and Repair
EXCOM	Executive Committee
FAA	Federal Aviation Administration
FAATC	FAA Technical Center
FCA	Functional Configuration Audit
FRDF	Facility Reference Data File
FTOR	Facility Technical Onsite Representative
GFE	Government Furnished Equipment
HNS	Hughes Network Corporation
IOC	Initial Operating Capability
ISP	Integrated Support Plan
ISSAC	Initial Supply Support Allowance Chart
ITP	Integration Test Plan
JAI	Joint Acceptance Inspection
LCN	Local Communications Network
LRU	Line Replaceable Unit
LSA	Logistics Support Analysis
LSAR	Logistics Support Analysis Record
MDDF	Material Delivery Data File
MPS	Maintenance Processor Subsystem
MSN	Message Switched Network
MTP	Master Test Plan
N/A	Not Applicable
NADIN	National Airspace Data Interchange Network
NAIFS	National Airspace Integrated Logistics Support
NAS	National Airspace System
NASSRS	NAS System Requirements Specification
NATCOM	National Communications Center
NAWPF	National Aviation Weather Processing Facility
NCC	Network Control Center
NCP	Network Control Processor
NOC	Network Operator's Console
NOTAM	Notice to Airmen
ORD	Operational Readiness Demonstration
OT&E	Operational Test and Evaluation
PAD	Packet Assembler-Disassembler
PAT&E	Production Acceptance Test and Evaluation
PC	Protocol Converter
PCA	Physical Configuration Audit
PCB&T	Personnel Compensation, Benefits and Travel
PDR	Preliminary Design Review
PDS	Power Distribution System
PIP	Project Implementation Plan
PMP	PAD Management Processor
PPL	Parts Provisioning List



PS	Packet Switch
PSN	Packet Switched Network
QRO	Quality Reliability Officer
RMA	Reliability, Maintainability, and Availability
SEI	System Engineering and Integration
SFO	Sector Field Office
SRR	System Requirements Review
TOR	Technical Onsite Representative
TPL	Transportation Systems Acquisition Review Council Program List
VRTM	Verification Requirements Traceability Matrix
WMSCR	Weather Message Switching Center Replacement

5. **AUTHORITY TO CHANGE THIS ORDER.** The Program Manager for Interfacility Communications may issue changes to this order that are necessary to manage and implement the project which do not affect policy, delegate authority, or assign responsibility.

6. **EXPLANATION OF CHANGES.** During 1991, the National Airspace Data Interchange Network (NADIN II) Packet Switched Network (PSN) program underwent a major program restructuring. Earlier problems with software development caused a significant slip in the program schedule. In October 1991, the FAA made a decision to separate the commercial off-the-shelf (COTS) portion of the acquisition, the packet switching network, from the custom development portion, to NADIN Message Switching Network/Packet Switched Network (MSN/PSN) Gateway. The MSN/PSN Gateway would then be hosted on a stand-alone processor. Subsequently, the COTS PSN was fully installed for network testing and the MSN/PSN Gateway will be installed and integrated into the COTS PSN in late 1993. A Deployment Readiness Review of the fully integrated network will be conducted in March 1994. This restructuring has resulted in significant changes to the Project Implementation Plan, particularly regarding Acquisition Strategy, Project Schedule and Status, Deployment, and Verification.

7.-19. **RESERVED.**



## CHAPTER 2. PROJECT OVERVIEW

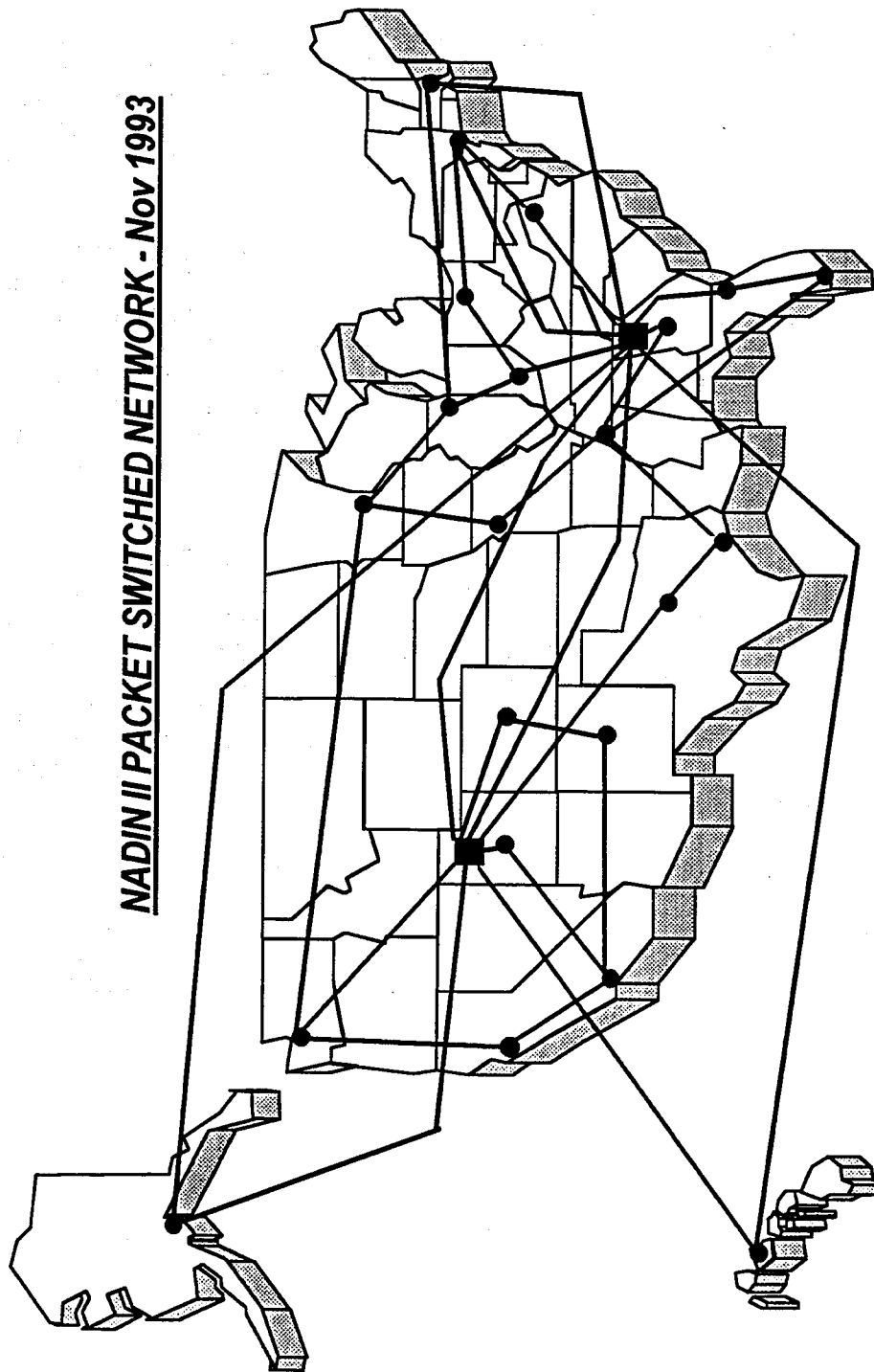
20. **SYNOPSIS.** The NADIN II PSN is an FAA-owned PSN which utilizes a standard X.25 communications protocol, and provides high-speed high-data-throughput communications between systems in the National Airspace System (NAS). The network consists of packet switching nodes and network control centers (NCC). The packet switching nodes are located at 24 operational sites in the Continental United States, Alaska, and Hawaii, including all 22 Air Route Traffic Control Centers (ARTCC), and two NADIN Sector Field Offices (SFO). Two operational NCC's, composed of equipment used to operate and manage the network, as well as a gateway between the PSN and the NADIN MSN, are located at the two NADIN SFO's in Atlanta and Salt Lake City. Nodes and NCC's in the operational network are connected by leased digital communication lines. Additional NCC's, nodes, and gateways are located at the FAA Technical Center (FAATC) and the FAA Academy in Oklahoma City for testing and training purposes, respectively. The NADIN II PSN backbone topology is illustrated in figure 2-1.

21. **PURPOSE.** The NADIN II PSN will provide the FAA with interfacility data communications in the NAS via a widely distributed network designed to carry high-speed digital data of computer systems between numerous source and destination points. This network provides the required data throughput speed, reliability, and availability of the growing community of computer systems in the NAS. It will support the information exchange requirements of programs in the Capital Investment Plan such as the Area Control Computer Complex, Real-Time Weather Processor, Weather Message Switching Center Replacement, Maintenance Processor Subsystem, and others. It will provide gateways to facilitate intercommunications between the NADIN PSN and the NADIN MSN. It will also provide communications access to systems external to the NAS.

22. **HISTORY.** The decision to procure an FAA-owned PSN was made in 1981. The designation for this network was NADIN II PSN. Acquisition of the NADIN II PSN presented an unprecedented opportunity to achieve optimum efficiency and compatibility for NAS systems by integrating them under a single X.25 network access protocol standard and utilizing the latest technological advances in communications networking.

a. **Approval.** The NADIN II PSN was approved as a Transportation Systems Acquisition Review Council Program List (TPL) acquisition. FAA authorization of funds to proceed with the procurement and implementation of the NADIN II PSN was approved in November 1987.

FIGURE 2-1. NADIN II PSN BACKBONE



b. Award. The FAA awarded the NADIN II PSN contract to Harris Corporation on July 28, 1989. The Harris design for the NADIN PSN featured a COTS Hughes Network Systems (HNS) packet switching network, and a custom software gateway to allow communications between the NADIN PSN and NADIN MSN. Phase I of the program provides for a network of 24 operational nodes, including two NCC's. Phase II provides options for expansion of the network, including an increase in data throughput and capacity, as well as augmentation of the network by up to 24 additional nodes.

c. Software. The NADIN II PSN program experienced software development problems in 1989 and 1990, resulting in a 2 year schedule slip and significant cost overruns. In order to provide for timely deployment of a working packet switching network, the FAA decided, in October of 1991, to deploy the COTS components of the network before completing the custom portions. On October 29, 1991, a stop-work order was issued for the custom portions of the NADIN II PSN, and a restructuring of the program was undertaken.

d. Contract. A NADIN II PSN Statement of Solicitation/Modification of Contract was issued on May 20, 1992. This modification altered a previous decision by restructuring Phase I of the NADIN II PSN program from two to three parts. During parts 1 and 2, COTS NCC's and nodes are to be installed. This enables the FAA to quickly field a working packet switching network. During part 3 of the program, the custom NADIN MSN/PSN gateway and other custom software are developed and integrated into the full network.

e. COTS Installation. Installation of the COTS portion of the network proceeded as planned and was completed November 20, 1992. Installation of the custom gateway and other custom elements was completed in December 1993. Plans call for an Operational Readiness Demonstration (ORD) of the network by April 1994.

23.-29. RESERVED.



### CHAPTER 3. PROJECT DESCRIPTION

30. FUNCTIONAL DESCRIPTION. The NADIN II PSN will provide connectivity, end-to-end error-free data transport, and automatic adaptive routing of digital data. It will include network monitoring and control functions. It will provide communications access to the NADIN MSN. A diagram of the NADIN PSN system components is presented in figure 3-1. A summary of the functional areas follows. Additional detailed descriptions are contained in section 3.7 (Required Operational Capabilities) of the NADIN II PSN Specification, FAA-E-2770c, dated September 25, 1992.

a. Data Transfer. The PSN provides transfer of packetized data over a backbone network through internal data communications switching that assures fast, reliable, ordered, and error-free delivery of packets in the following manner:

(1) Routing. The PSN provides routing decisions and movement of data within the logical and physical backbone network, including automatic adaptive routing.

(2) Congestion Control. The PSN makes full use of network resources to carry as much traffic as possible (increased throughput) without exhausting the capabilities of network components. This process balances network data loading and helps prevent congestion on one or more individual links. It also minimizes the impact that a PSN node failure might otherwise have on the data handling capability of the network.

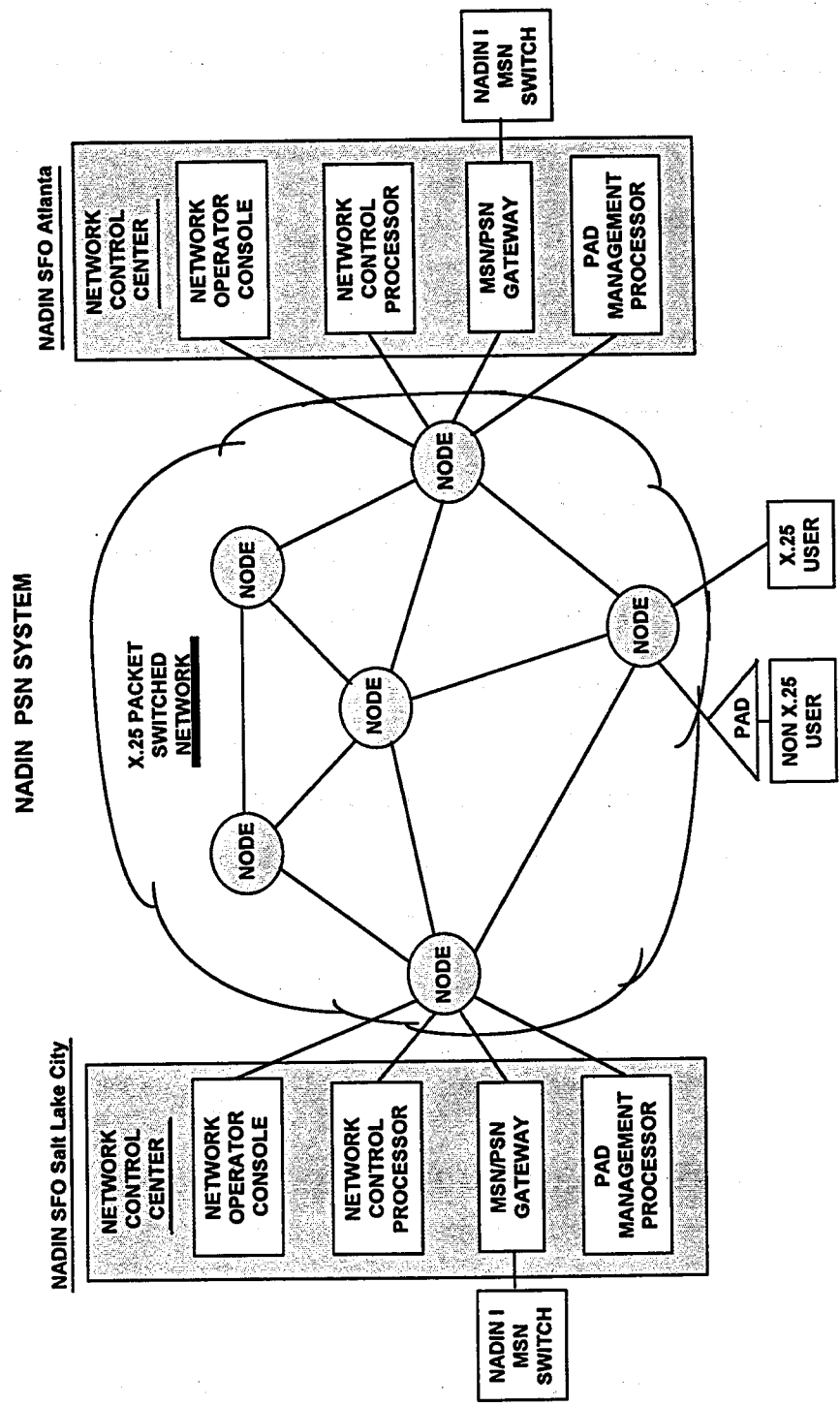
(3) Satellite-Link Operation Support. The PSN backbone network can use geosynchronous satellite circuits and equipment efficiently in conjunction with terrestrial circuits and equipment.

(4) Transmission Media. The PSN is capable of using a variety of transmission media for backbone link connectivity, including geosynchronous satellite, landline, and microwave circuits.

b. Network Access. The PSN provides the following capabilities for subscribers to access network data transfer services:

(1) Standard Network Access. The PSN provides the subscribers the ability to interface with a packet switching node and to access the backbone network data transfer services through the use of the 1984 CCITT Recommendation X.25 protocol.

FIGURE 3-1. NADIN II SYSTEM COMPONENTS





(2) Nonstandard (Non-X.25) Network Access. The PSN provides the capability for non-X.25, asynchronous terminals to access the network through protocol converter/packet assemblers-disassemblers.

c. Service Control. The PSN provides the following service controls:

- (1) Provides user access to network services.
- (2) Records and reports all attempts to access the network and individual network services.
- (3) Collects and stores statistical information on service utilization and related traffic volumes.

d. Network Control. The PSN provides the following network control services:

- (1) Configuration Management.
  - (a) Configuration databases management.
  - (b) Network management software.
- (2) Operations Management.
  - (a) Network startup and shutdown.
  - (b) Orderwire communications.
  - (c) Fault detection.
  - (d) Fault reporting and alarms.
  - (e) Fault isolation and diagnosis.
  - (f) Fault recovery.
  - (g) Virtual circuit interruption.
- (3) Network Management.
  - (a) Network traffic and performance data collection.
  - (b) Data storage.
  - (c) Data processing and reporting.

e. Gateway Service. The PSN provides the following message conversion and relay services for data between NADIN II PSN subscribers and NADIN MSN subscribers:

(1) Message Conversion Service.

(a) Message conversion for data flowing from PSN to MSN.

(b) Message conversion for data flowing from MSN to PSN.

(c) Message address conversion.

(d) Code conversion.

(e) Maximum data block transfer (3700 characters).

(2) Message Relay Service.

(a) Message relay for data flowing from PSN to MSN.

(b) Message relay for data flowing from MSN to PSN.

(c) Address conversion.

(d) Statistics collection and transfer.

(e) Address table maintenance.

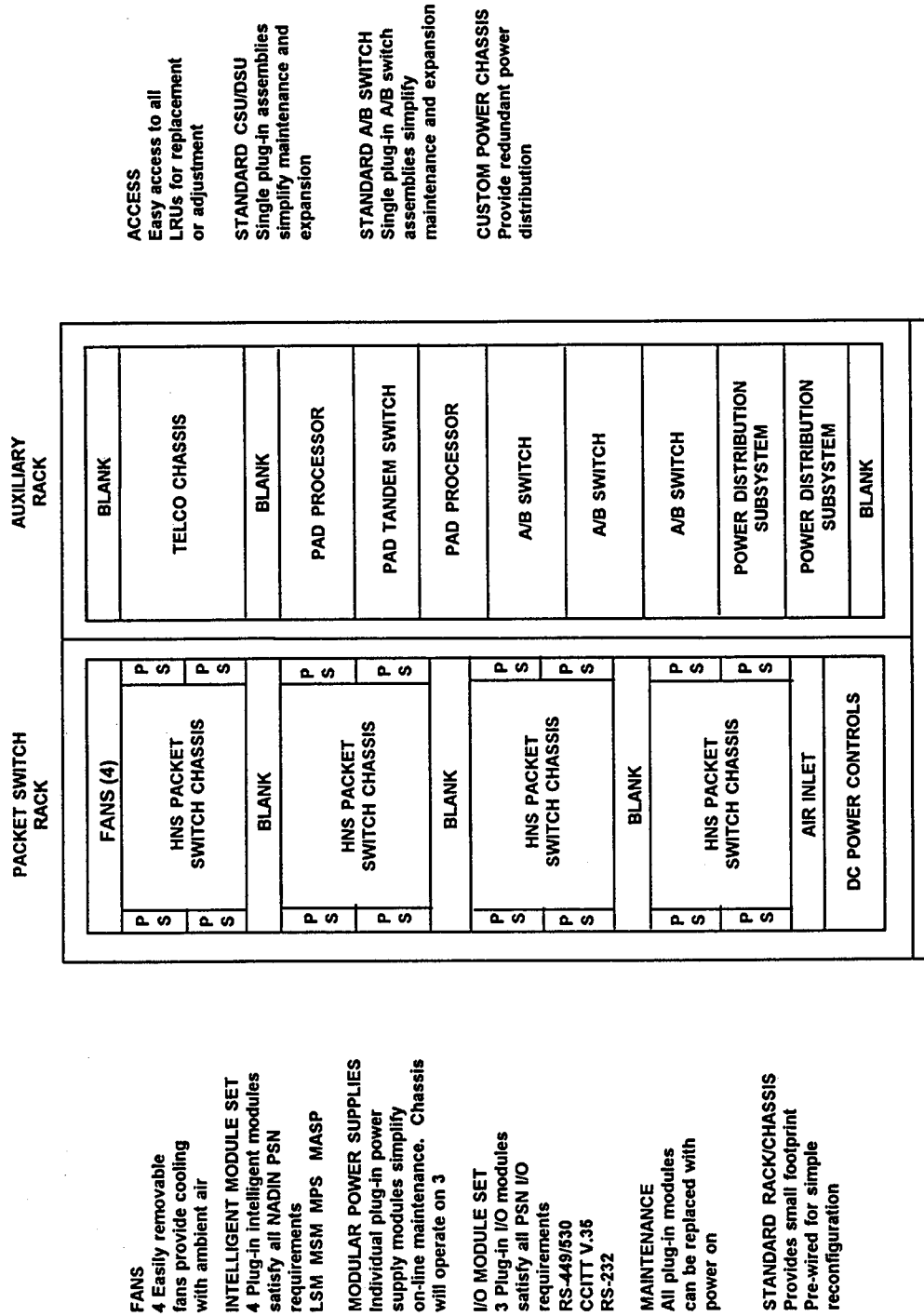
(f) Status and alarm reporting.

(g) Special handling of high-priority messages.

31. PHYSICAL DESCRIPTION.

a. Packet Switch Node Facilities. The major units of the packet switch node are the same for all NADIN II PSN sites. They consist of one packet switch (PS) rack, one auxiliary (AUX) rack, and one maintenance console. Figure 3-2 shows a front rack elevation of the PS and AUX racks and the packet switch equipment that they house. Each rack is the same size, 25" wide by 36" deep by 84" high, and may weigh up to 1,000 pounds with PSN equipment installed. All replaceable parts are readily accessible and can be handled with ease, with the exception of the Power Distribution Center (PDS), which weighs 170 pounds.

FIGURE 3-2. ILLUSTRATED RACK ELEVATION FOR PACKET SWITCH NODE



The maintenance console and printer, not shown in figure 3-2, are situated on a portable cart (24" wide by 18" deep). Additional racks will be required in the event of certain expansion scenarios. The packet switch node is manufactured by Hughes Network Systems.

b. NCC Facilities. The major units of the NCC consist of the following:

(1) Packet Switch Node. One PS rack, one AUX rack, and one maintenance console.

(2) Network Control Processor (NCP). One Digital Equipment Corporation (DEC) MicroVAX III (3800) computer with 32-megabyte memory housed in two 27-inch cabinets. The size of each cabinet is 21" wide by 18" deep by 27" high.

(3) Network Operator's Console (NOC). One PS/2 Model 70 workstation that is manufactured by the IBM Corporation. The workstation includes keyboard and color monitor.

(4) Peripheral Devices. One tape drive, one video terminal, two printers, and one constant voltage conditioner to protect against line transients.

(5) Gateway Subsystem. One DEC MicroVAX 4000 with 32-megabyte memory. The VAX is equipped with a SIMPACK ICP-3222 card for an X.25 connection to the network, and a SIMPACK ICP-1622 card for the ADCCP interface to the NADIN MSN. Also part of the Gateway subsystem are a VXT 2000 terminal which is the operator interface to the Gateway subsystem, a VT320 system console for VAX 4000 operations, and an LA 210 printer.

(6) PAD Management Processor (PMP). One IBM-compatible personal computer (Unisync # U4028) with 3 megabytes RAM and an 80 megabyte hard disk, equipped with an X.25 interface card for connection to the network, and an Epson LX810 printer.

### 32. SYSTEM REQUIREMENTS.

a. Site Information. Site surveys were performed in 1990 at each ARTCC and NAWPF where NADIN II equipment is located. Equipment position was determined; and cabling, power, and air conditioning provisions were reviewed at each site. Additional site surveys were conducted in the summer of 1992. The second surveys were performed at those sites which had experienced changes since 1990 which might have had an impact on the location or performance of NADIN II equipment. Each site adequately accommodates the NADIN II equipment designated for that site.

b. Space Requirements.

(1) Packet Switch Node. The PS rack, AUX rack, maintenance console, and additional PS rack (in the event of three-times expansion) require 108 sq. ft. (9 ft. by 12 ft.). A complete rack may weigh up to 1,000 pounds.

(2) Network Control Center. The packet switch node, the NCP, the NOC, the gateway subsystem, the PMP, and all supporting peripheral devices require a total of 400 sq. ft. (i.e., 20 ft. by 20 ft.).

c. Environmental Requirements. The NADIN II PSN equipment is designed to operate in normal office environments. The equipment operates with either under floor air (i.e., raised floor) or ambient air for cooling. It does not require conditioned air to be ducted to the racks.

d. Power Requirements. The critical bus is the recommended source for AC power.

(1) Packet Switch Node. 30 amps, 3-phase, 5.6 Kw.

(2) Network Control Center. 30 amps, 3-phase, 8.6 Kw.

33. INTERFACES. The end-state NADIN PSN II interfaces, as baselined in NAS-SS-1000, are shown in figure 3-3. In addition, provisions are being made to baseline the consolidated NOTAM system (CNS) into the NAS and develop an X.25 interface for the CNS to access the PSN. The following interface requirements documents apply:

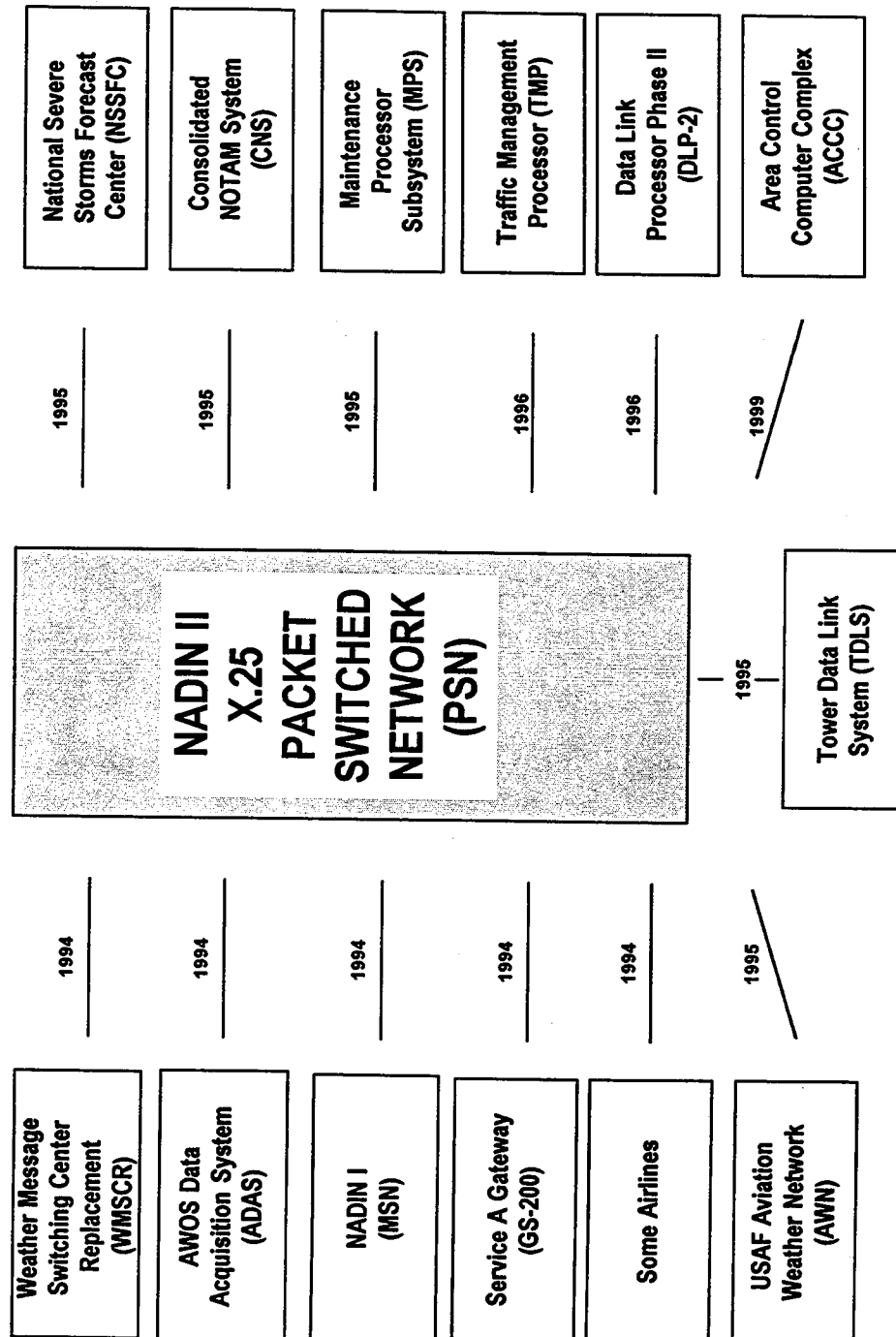
a. National Airspace Data Interchange Networks X.25 Packet Mode Users, NAS-IR-43020001.

b. Users of National Airspace Data Interchange Network (NADIN) Packet Switched Network (PSN) Asynchronous Protocol Converter/Packet Assembler-Disassemblers (PC/PAD), NAS-IR-43020002.

c. National Airspace Data Interchange Network Packet Switched Network Gateway/National Airspace Data Interchange Network Message Switched Network, NAS-IR-43014302.

d. NADIN Packet Switched Network (PSN)/Local Communications Network (LCN) Gateway, NAS-IR-21024302.

FIGURE 3-3. NADIN II PSN PLANNED USER SYSTEMS



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e. Maintenance Processor Subsystem (MPS)/National Airspace  
Data Interchange Network Packet Switched Network (NADIN PSN)  
Network Control Center (NCC), NAS-IR-51034302.

f. Area Control Facility (ACF)/NADIN Packet Switched  
Network (PSN), NAS-IR-61004302.

34.-39. RESERVED.





## CHAPTER 4. PROJECT SCHEDULE AND STATUS

### 40. PROJECT SCHEDULES AND GENERAL STATUS.

a. Contractor Work Schedule. The NADIN II PSN contractor, Harris Corporation, is maintaining a master milestone schedule of tasks and deliverables that are planned for accomplishing the work identified in the contract. This work includes software development, system integration, system test, technical manuals and training development, and integrated logistics support development. Detailed schedule information on the contractor work schedule is available through the NADIN II project manager, ANC-800.

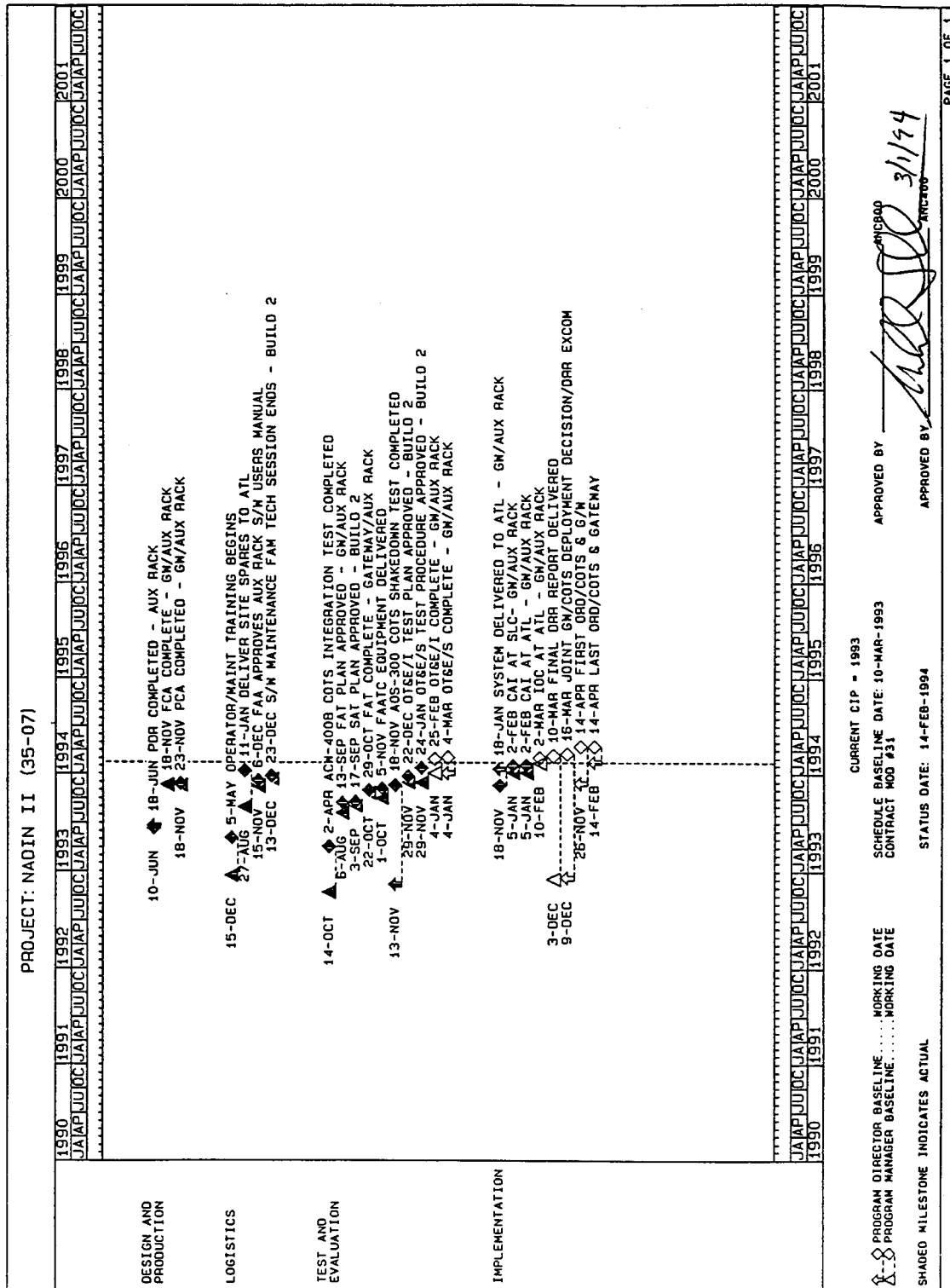
b. Site Installation Schedule. The Material Delivery Data File (MDDF) provides a current schedule of the NADIN II PSN equipment delivery. Equipment delivery occurs one week prior to the start of site installation. All site preparation work should be completed 30 days prior to equipment delivery.

c. NADIN II Restructured Program Schedule. The restructuring of the NADIN II PSN has led to some changes in the program schedule. Delivery, installation, testing, and integration of the COTS portions of the network are being performed first, with concurrent development and subsequent installation and integration of the custom gateway. Installation and acceptance testing of the COTS nodes and NCC's at all network sites was completed as of November 20, 1992. An ORD of the COTS network is anticipated in April 1994. The FAA completed installation of the custom gateway in December 1993. Commissioning for COTS elements is planned for April 1994; commissioning of the custom gateway is planned for December 1994.

41. MILESTONE SCHEDULE SUMMARY. The following are the major program milestones that pertain to NADIN II PSN development and implementation. Completion status is noted only for those milestones which have been met. Figure 4-1 provides a Program Schedule.

a. Systems Requirements Review (SRR). Software requirements specification and interface requirements specifications were approved and became the allocated baseline for all subsequent design, implementation, and testing. This milestone has been completed.

FIGURE 4-1. NADIN II PSN SUMMARY MILESTONE SCHEDULE



b. Preliminary Design Review (PDR). Software top-level design documents were approved and became the configuration-controlled design baseline. This milestone has been completed.

c. Initiate the Deployment Readiness Review (DRR) process. ANC-800 prepared for an internal review of the DRR status approximately 14 months before the pilot network delivery. This milestone has been completed.

d. COTS Factory Acceptance Test. The contractor was authorized to ship the pilot network. This milestone has been completed.

e. COTS Network Site Acceptance Test Plan. The plan addressed equipment diagnostics and node readiness tests to check the success of the installation and integration. This milestone has been completed.

f. COTS System Delivered to Test and Evaluation Sites. The sites include the NAWPF's at Atlanta, Salt Lake City, and the FAA Academy, in addition to the FAA Technical Center. This milestone has been completed.

g. ACW-400B NAS Integration Test Plan. The plan addressed OT&E/NAS integration per Order 1810.4A, for the COTS Network. This milestone has been completed.

h. COTS System Delivered to Last Operational Site. Equipment/Software physically arrived at the last site. This milestone has been completed.

i. Last Site Acceptance Test for the COTS Network. This milestone has been completed.

j. Site Acceptance and Integration Tests of the COTS Network Initial Operating Capability (IOC). The contractor completed a successful full network acceptance test effort for the FAA to initiate contractor-acceptance inspection. This milestone has been completed.

k. System Delivered to FAA Academy. The training node was installed at the FAA Academy. This milestone has been completed.

l. Updated Project Implementation Plan (PIP). The PIP becomes an FAA order. A Project Implementation Plan, dated November 29, 1990, was approved. This document is an update to that order.

m. ACW-400B NAS Integration Test of the COTS Network. ACW-400B begins to estimate and/or determine NADIN PSN operational effectiveness to be part of the NAS.

n. Critical Design Review. A software detailed design document and interface design documents are approved and included in the design baseline.

o. AOS-550 FAA Shakedown Test Plan for the COTS Network. The plan addresses Operational Test and Evaluation (OT&E)/FAA shakedown per Order 1810.4B. 1810.4B is the latest version of the order.

p. AOS-550 FAA Shakedown Test of the COTS Network. AOS-550 begins to estimate and/or determine NADIN PSN readiness for full operation as part of the NAS.

q. DRR Report Submittal. ANC-800 submits the final DRR report to AAF-1.

r. DRR Executive Committee (EXCOM). The DRR EXCOM meets and makes a deployment decision.

s. Joint Acceptance Inspection (JAI). The Joint Acceptance Board assembles to complete the final JAI of the COTS network.

t. Operational Readiness Date (ORD). The NADIN II PSN network is commissioned.

42. INTERDEPENDENCIES AND SEQUENCE. The NADIN II PSN has no interdependencies with other systems that will affect its capabilities to achieve functionality. The Weather Message Switching Center Replacement (WMSCR) program, however, is dependent on a functional NADIN COTS PSN and custom gateway to support integration testing.

43.-49. RESERVED.

## CHAPTER 5. PROJECT MANAGEMENT

50. PROJECT MANAGEMENT, GENERAL. Subparagraphs a-e are the project management organizations at the FAA Washington headquarters, FAA Technical Center, FAA Academy, FAA Logistics Center, regions, and sites that are responsible for the successful implementation of the NADIN II PSN.

a. FAA Washington Headquarters Project Management.

(1) Program Director, Communications and Aircraft Acquisition (ANC-1). Under the Associate Administrator for NAS Development (AND), the Program Director for Communications and Aircraft Acquisition has responsibility for the NADIN II PSN program and has assigned management of the program to the Program Manager for Interfacility Communications (ANC-400).

(2) Program Manager, Interfacility Communications Program (ANC-400). ANC-1 has assigned the NADIN II project to the Program Manager, Interfacility Communications Program, for management.

(3) Associate Program Manager for Engineering (APME), (ANC-800). The Interfacility Communications Division has responsibility for engineering management.

(4) NADIN II Project Manager (ANC-800). A member of the Interfacility Communications Division has been designated the NADIN II Project Manager and is the source for management direction in the implementation of the NADIN II PSN. The project manager is responsible for developing, coordinating, and accomplishing the total PSN implementation from the engineering and development phase through the deployment and commissioning phase. The scope of the PSN implementation to be accomplished requires that the PSN performs to the specified requirements and is ready to be integrated into the NAS, and that the FAA is ready to receive, operate, and provide life-cycle support to the PSN when deployed and commissioned.

(5) Associate Program Manager for Contracts (APMC), (ASU-330B). The APMC, converts program requirements to contractual documents and performs contract management activities concerned with assuring that the terms of the contract are met. The APMC is the only person authorized to direct the contractor to make changes that will affect prices, deliverables, or schedules.

(6) Quality Reliability Officer (ORO), (ASU-426). ASU-426 provides an Associate Program Manager for Quality (APMQ) to assure that the contractor observes in-plant quality assurance in accordance with the contract.

(7) Associate Program Manager for System Engineering (APMSE), (ASE-200). Management of system engineering for NADIN II PSN has been assigned to a member of NAS System Engineering Service.

(8) National Airspace Integrated Logistics Support (NAILS) (ANS-400). ANS-400 assigns an Associate Program Manager for Logistics (APML) to ensure that all applicable NAILS requirements are identified, managed, and integrated in a manner that provides for total life-cycle support.

(9) NADIN II PSN Regional Coordinator. The NADIN II project manager, ANC-800, has established a position of Regional Coordinator in the project. The coordinator functions as the primary point of contact in the project office for FAA regional and facility representatives.

b. FAA Technical Center.

(1) Associate Program Manager for Test (APMT), (ACW-400B). The Associate Program Manager for Test is a member of ACW-400B, NADIN II Procurement Support, part of ACW-400, System Design, Transition, Communication Division and ACW-1, Engineering, Integration, and Operational Evaluation Service. The APMT supports the PSN implementation as per the requirements in Order 1810.4B, FAA NAS Test and Evaluation Program. The responsibilities of the APMT include development of a Master Test Plan (MTP) and Integration Test Plan (ITP), developing and conducting operational test and evaluation (OT&E), Integration and Operational Test Procedures, Quick Look Report, Final Test Report and NAS integration testing, and providing general test support to ANC-800.

(2) AOS-550. AOS-550 supports the NADIN II PSN implementation per the requirements in Order 1810.4B. This support includes developing and conducting NAS shakedown testing and establishing and maintaining a PSN system support facility.

(3) ACN-320. ACN-320 will perform site preparation at the FAA Technical Center for the NADIN II PSN equipment installation.

c. FAA Academy (AMA-1). The FAA Academy is responsible for overseeing contractor development of a training program,

monitoring contractor-conducted training, developing an FAA follow-on attrition training program, and supporting shakedown testing. A member of the FAA Academy has been designated a Contracting Officer's Technical Representative (COTR) for Training.

d. FAA Logistics Center (AML-200). The FAA Logistics Center is responsible for provisioning, supply support, and management of Depot level maintenance performed by either the FAA Logistics Center or the contractor.

e. Regional Project Management.

(1) Associate Project Managers (APM). The FAA regions each designate a NADIN II PSN regional associate project manager (APM) responsible for the planning and implementation of all phases of the PSN within the region.

(2) ARTCC and NADIN SFO Project Management. The Technical On-site Representatives (TOR) at the ARTCC's and the NADIN SFO's are assigned by the region and will have site responsibility for the contractual management of the NADIN II PSN installation within the site. The TOR is the ASU-330B contracting officer's representative to ensure that the PSN contractor performs in accordance with the terms of the contract, and is responsible for all FAA coordination with the contractor at the site. The TOR will attend PSN contractor training courses to the extent possible.

51. PROJECT CONTACTS. Listed in figure 5-1 are the key project management personnel designated as contacts for their respective organizations in the FAA Washington headquarters. Project management personnel for ASU-426 quality assurance, the FAA Technical Center, the FAA Academy, the regions, and field facilities are listed in appendix 1.

52. PROJECT COORDINATION. In addition to the project management organizations described in paragraph 50, the coordination and active support of a number of other FAA organizations are of great importance to the successful implementation of the NADIN II PSN. The organizational elements requiring coordination on the PSN implementation include the following:

Organization	Coordination Requirements
ANC-400	Program management
ANC-800	Program engineering and project management
ASU-330B	Contract management
ASU-426	In-plant quality assurance

ANS-400	Logistics management
ACW-400B	Test management
AOS-550	Shakedown test and system support
ACN-320	FAATC site preparation
AMA-1	Training
AML-1	Logistics
AAF-1	Deployment Readiness Review
ACS-340	Security management
ASE-1	System engineering
ASU-100	Schedule management
ASM-700	Supply and provisioning policy, and life-cycle costing for supply support
ALR-100	Labor policy coordination
ANS-200	Transition planning and engineering, and facilities transition
ASM-200	Maintenance operations
ASM-300	Telecommunications management
AHT-400	Airway Facilities training
ATQ-1	OT&E independent assessment
AMA-424	Airway Facilities automation training development

**FIGURE 5-1. PROJECT MANAGEMENT PERSONNEL**

Name	Title/Address	Telephone
Mike Shveda	Program Manager ANC-400 800 Independence Ave., SW Washington, DC 20591	(202) 287-7187
Loretta Parker	Division Manager ANC-800 800 Independence Ave., SW Washington, DC 20591	(202) 287-7158
Feisal Keblawi	APME ANC-800 800 Independence Ave., SW Washington, DC 20591	(202) 287-7162
Paula Compton	APMC ASU-330B 800 Independence Ave., SW Washington, DC 20591	(202) 267-7694
E. K. Reed	APML ANS-420 800 Independence Ave., SW Washington, DC 20591	(202) 267-7432
Dawn Abel	APMSE ASE-200/SEIC 400 Virginia Avenue, SW Washington, DC 20024	(202) 646-5322



53. PROJECT RESPONSIBILITY MATRIX. Figure 5-2 presents a matrix that identifies the FAA organization responsible for each significant function of the PSN implementation.

54. PROJECT MANAGERIAL COMMUNICATIONS. Annual program reviews are scheduled and conducted by the ANC-800 NADIN II project manager with the participating FAA offices, services, centers, and regions. Technical interchange meetings to explain and discuss current implementation issues are convened with various organizational elements and the NADIN II PSN contractor on an unscheduled, as-required basis. Other means of communications include periodic teleconferences, use of FAA E-Mail, and project newsletters.

55. IMPLEMENTATION STAFFING. There are no unique or peculiar staffing requirements associated with the implementation of the NADIN II PSN. ACW-400 is providing integration test personnel and AOS-300 is providing shakedown test personnel.

56. PLANNING AND REPORTS. The following reports and plans are required during the acquisition, testing, and implementation phases of the NADIN II PSN:

a. Contractor Management Documentation. The NADIN II PSN contractor will submit the following contract data requirements list (CDRL) items as well as other contract items in accordance with the final negotiated contract:

- (1) Management Plan.
- (2) Software Development Plan.
- (3) Configuration Management Plan.
- (4) Software Configuration Management Plan.
- (5) Configuration Status Accounting Reports.
- (6) Functional/Physical Configuration Audit Plan.
- (7) Contractor Master Test Plan.
- (8) Test Procedures.
- (9) Test Report (Factory Tests).
- (10) Test Report (Site Tests).
- (11) Reliability and Maintainability Program Plan.

FIGURE 5-2 NADIN II PSN PROJECT RESPONSIBILITY MATRIX

Project Functions	ANC-400	ANC-800	ASU-330B	ANS-420	ACW-400B	AOS-550	AMA-1/424	AML-1/200	ASU-426	Regional APM	Facility TOR
Contract Oversight	S	S	P	S							
Development Oversight	S	P			S	S	S	S	S		
DT & E	S	P			S	S			S	S	
OT & E/NAS Integration	S	S			P	S				S	
OT & E/FAA Shakedown	S	S			S	S	S	S	S	S	
DRR Process Oversight	S	P	S	S	S	S	S	S	S	S	S
Site Preparation	S	S								S	P
Site Installation Oversight	S	S	S		S	S				S	P
Contractor Acceptance Inspection	S	P	S		S	S	S	S	S	S	S
Joint Acceptance Inspection	S	S	S		S	S	S	S	S	S	P
Training	S	S		S			P				
Provisioning	S	S		S				P			
System Support	S	S		S		P					

**Legend**

P = Primary Responsibility

S = Support Responsibility

- (12) Integrated Support Plan (ISP).
- (13) Logistics Support Analysis (LSA) Data.
- (14) Post Production Support Plan.
- (15) Training Plan.

b. FAA Implementation Plans and Reports. The NADIN II PSN implementation activities will be documented in the following key FAA plans and reports:

FAA Documentation	Lead
Project Master Test Plan	ACW-400B/ANC-800
National Airspace Integrated Logistics Support (NAILS) Plan	ANS-420
Deployment Readiness Review Report	ANC-800/AAF-11
NAS Integration Test Plan	ACW-400B
Integrated Test Plan (ITP)	ACW-400B
OT&E Integration and Operational Test Procedures	ACW-400B
Quick Look Report	ACW-400B
Final Test Report	ACW-400B
FAA Shakedown Test Plan	AOS-550
Joint Acceptance Inspection Report	Regions/ Airways Facilities

57. APPLICABLE DOCUMENTS. The current version of the following documents are applicable to the implementation of the NADIN II PSN:

- a. FAA-STD-002, Facilities Engineering Drawings Preparation.
- b. FAA-STD-019, Lighting Protection, Grounding, Bonding, and Shielding Requirements for Facilities.
- c. FAA-STD-020, Grounding, Transient Protection, and Shielding Requirements for Equipment.
- d. FAA-STD-021, Configuration Management.
- e. FAA-STD-024, Preparation of Test and Evaluation Plans and Test Procedures.
- f. FAA-STD-028, FAA Standard Contract Training Programs.
- g. FAA-STD-036, Preparation of Project Implementation Plans.

- h. FAA-STD-042, National Airspace System Open System Interconnection Naming and Addressing.
- i. FAA-STD-2494/b, Technical Instruction Book Manuscript Preparation and Production
- j. Order 1320.1D, FAA Directives System.
- k. Order 1320.48, Engineering Field Support Sector Maintenance Program Procedures-National Airway Engineering Field Support Sector, ASM-150, and National Automation Engineering Field Support Sector, ASM-160.
- l. Order 1800.8, National Airspace System Configuration Management.
- m. Order 1800.58, National Airspace Logistics Support Policy.
- n. Order 1810.4B, FAA NAS Test and Evaluation Policy.
- o. Order 1810.5, System Development Program Management Procedures
- p. Order 6030.45, Facility Reference Data File (FRDF).
- q. FAA-E-2770c, NADIN II PSN Functional Specification.
- r. FAA-G-1375c, Spare Parts-Peculiar for Electronic, Electrical, and Mechanical Equipment.
- s. NAS-SS-1000, NAS System Specification.
- t. NAS-DD-1000B, NAS Level 1 Design Document.
- u. MIL-STD-483, Configuration Management Practices for Systems, Equipment, Munitions, and Computer Software.
- v. MIL-STD-1388-1, Logistics Support Analysis.
- w. MIL-STD-1388-2, DOD Requirements for a Logistics Support Analysis Record.
- x. MIL-STD-1561, Provisioning Procedures.
- y. DOD-STD-2167, Defense System Software Development.
- z. MIL-E-17555, Electronic and Electrical Equipment Accessories, and Repair Parts: Packaging and Packing of.

- aa. DOD-D-1000, Drawings, Engineering, and Associated Lists.
  - bb. DOD-STD-100, Engineer Drawing Practices.
  - cc. Consultative Committee for International Telegraphy and Telephony (CCITT), 1984 Version, Data Communication Network Services and Facility Interfaces, Recommendation X.1 - X.32
  - dd. CCITT, 1984 Version, Data Communication Transmission Signalling and Switching Network Aspects Maintenance and Administrative Arrangements X.40 - X.181.
  - ee. NAS-IR-43020001, National Airspace Data Interchange Networks X.25 Packet Mode Users.
  - ff. NAS-IR-43020002, National Airspace Data Interchange Network Packet Switched Network Asynchronous Protocol Converter/Packet Assembler-Dissassemblers, (PC/PAD).
  - gg. NAS-IR-43014302, National Airspace Data Interchange Network Packet Switched Network Gateway/National Data Interchange Network Message Switched Network.
  - hh. NAS-IR-21024302, National Airspace Data Interchange Network Packet Switched Network/Local Communications Network Gateway.
  - ii. NAS-IR-51034302, Maintenance Processor Subsystem/National Airspace Data Interchange Network Packet Switched Network (NADIN PSN) Network Control Center.
  - jj. NAS-IR-61004302, Area Control Facility/NADIN Packet Switched Network.
- 58.-59. RESERVED.



**CHAPTER 6. PROJECT FUNDING**

60. **PROJECT FUNDING STATUS, GENERAL.** FAA authorization of funds to proceed with the procurement and implementation of the NADIN II PSN was approved in November 1987. HOWEVER, AT THE PRESENT TIME THERE IS NO FUNDING IN THE FACILITIES AND EQUIPMENT ACCOUNT FOR THE NADIN PSN PROGRAM BEYOND 1995. The contract was structured as an Indefinite Delivery/Indefinite Quantity-type contract. Project funding status information is available through the NADIN II project manager, ANC-800.

61.-69. **RESERVED.**





## CHAPTER 7. DEPLOYMENT

70. GENERAL DEPLOYMENT ASPECTS. In accordance with a variance approved by the Associate Administrator for Airway Facilities (AAF-1), the COTS network has been fully installed for testing. As the equipment was installed, installation and network integration testing was performed at each site. A DRR process is in place for the NADIN II COTS PSN. A separate DRR process is being implemented for the custom NADIN MSN/PSN Gateway.

71. SITE PREPARATION. Initial site surveys were performed by the NADIN II PSN contractor between February 1990 and September 1990. Due to changes at several sites, which potentially affected equipment installation, second site surveys were performed at the affected sites in the summer of 1992. All site preparation work was completed, and the PSN COTS equipment was installed by the end of November 1992. Site preparation plans for installation of the NADIN PSN/MSN Gateway are not yet firm.

72. DELIVERY. PSN COTS network equipment delivery has been completed to all sites. The custom PSN/MSN Gateway was completed in December 1993.

73. INSTALLATION PLAN. The NADIN II PSN contractor has delivered, installed, integrated, and site tested the COTS PSN. Planning for the NADIN PSN/MSN Gateway is not yet firm.

a. Master Installation Plan. The contractor prepared and delivered a master installation plan for the COTS PSN.

b. Site Installation Plan. The contractor prepared and delivered a site installation plan for each NADIN II PSN site, which permitted the installation of the PSN equipment with minimal impact upon existing facilities and systems.

c. Installation Planning Reports. The contractor prepared and delivered an installation planning report for each NADIN II PSN site.

d. As-Built Site Installation Drawings. The contractor is required to provide the FAA with complete as-built site installation drawings of NADIN II PSN equipment as installed at each site facility. These drawings must include power distribution cabling, signal and control cables, transmission cables, grounding systems, floor plan, and equipment identification and connectivity per FAA-STD-002. A set of red-lined, as-built drawings is to be provided to each site facility. A final set (no redlines) of reproducible as-built

drawings is to be provided to the TOR and contracting officer. Drawings may be furnished electronically between the contractor and the FAA regions should the capability exist.

74.-79. **RESERVED.**

## CHAPTER 8. VERIFICATION

80. **FACTORY VERIFICATION.** A series of factory and installation tests were performed on the COTS PSN by the NADIN II PSN contractor. These tests were witnessed by FAA personnel. NADIN PSN/MSN Gateway testing plans are not firm at this time. Tests performed on the COTS network included:

a. **Hardware and Software.** COTS hardware and software tests to demonstrate that COTS subsystems meet the nondevelopmental requirements of the specification and the functions described in the contractor supplied documentation.

b. **Environment.** Environment verification tests to demonstrate compliance by the PSN equipment with the electrical and environmental requirements of the specification.

c. **Electromagnetic.** Electromagnetic interference verification tests to demonstrate that the PSN equipment is not affected by electrical or electromagnetic interference created by other equipment in the same or nearby buildings, and that the operation of the PSN equipment does not affect the operation of such other equipment.

d. **Reliability/Maintainability/Availability (RMA).** RMA test to demonstrate compliance by the PSN equipment with appropriate RMA requirements in the specification.

81. **CHECKOUT.** The contractor performed checkout testing to verify the operational capability of the COTS PSN network after site installation. Installation and checkout plans for the PSN/MSN Gateway are not yet firm. The TOR witnessed the COTS network checkout testing and verified by signature that the PSN equipment was properly delivered and installed. FAA personnel witnessed each site checkout test, as directed by the NADIN II project manager (ANC-800). Checkout testing of the COTS network included the following activities:

a. **Testing.** Testing the installed PSN equipment with factory diagnostics to verify the performance of the equipment following installation.

b. **Verifying Support.** Verifying that required support items, such as logistics and support manuals are available, technically compatible, and in compliance with specifications.

c. Verifying Installation. Verifying that the PSN installation is compliant with applicable standards, drawings, specifications, and FAA directives.

82. CONTRACTOR INTEGRATION TESTING. The contractor installed a pilot network prior to implementation of the full NADIN II PSN. The contractor primarily performed an inspection and verified the operation of each node as it was installed and connected to other nodes within the pilot network. As with the full network testing described later, a complete verification of the pilot network could not be done due to the unavailability of certain trunk lines at the time of the test. After all pilot network nodes had been installed and operationally tested, the contractor installed the remaining nodes of the full network, performed operational tests on each node, and performed interconnectivity tests only with other nodes that had established trunk lines. ACW-400B will confirm full network interconnectivity with all trunk lines during OT&E integration and OT&E operational tests discussed in paragraph 84. No integration tests with external systems were done in the field. Integration testing for the MSN/PSN Gateway is in progress and scheduled for completion in February 1994.

83. CONTRACTOR ACCEPTANCE INSPECTION (CAI). A CAI was conducted on a node-by-node basis at each site of the full COTS PSN after contractor integration testing was successfully completed.

a. CAI Preparation. Preparation for CAI included the development of a pre-CAI punch list that identified corrective actions to be made by the contractor. In addition to ensuring that the contractual requirements of the NADIN II PSN specification and statement of work were met, the following events at all the PSN sites required completion prior to CAI:

(1) Installation, meeting applicable standards, drawings, specifications, and FAA directives.

(2) Compliance with FAA standards for grounding, bonding, and shielding.

(3) Proper labeling and identification of distribution and demarcation panels boxes and cabinets.

(4) Visual and electrical inspection of all cables prior to installation.

(5) Satisfactory equipment appearance and ventilation.

(6) Accomplishment of occupational safety inspection.

(7) Freedom of PSN equipment from electromagnetic interference.

b. Gateway CAI. A CAI of the PSN/MSN Gateway will be conducted following successful Gateway installation and integration.

84. FAA INTEGRATION TESTING. The FAA Technical Center Associate Program Manager for Test (APMT) (ACW-400B) will direct the conduct of NAS integration tests on the NADIN COTS network in accordance with Order 1810.4B. ACW-400B will conduct integration testing on the full COTS network. FAATC and contractor personnel will conduct the tests supported by Harris and NCC FAA personnel. ANC-800 will support ACW-400B in the development of NAS integration requirements, the preparation of test plans and procedures, and in the conduct of the tests. FAA organizations in AOS-300, the regions, and the field facilities will support NAS integration testing as coordinated by ACW-400B. Integration testing of the PSN/MSN Gateway will be conducted at the FAATC by ACW-400B following successful factory acceptance testing.

85. SHAKEDOWN AND CHANGEOVER. AOS-550 will direct the conduct of FAA shakedown on the NADIN II PSN in accordance with Order 1810.4B. FAA organizations in the regions and the field facilities will support FAA shakedown as coordinated by AOS-550. Integration testing of the PSN/MSN Gateway will be performed by ACW-400B during shakedown testing at the FAATC.

86. JOINT ACCEPTANCE INSPECTION (JAI). A JAI will be conducted for the COTS PSN network. A separate JAI for the PSN/MSN Gateway subsystem may be conducted following FAA integration and shakedown of the Gateway. Plans for a Gateway JAI are not yet firm.

a. Process. The JAI is an inspection process by which the individual Airway Facilities sector will formally accept custody of the NADIN II PSN equipment and assume maintenance responsibility. It will be accomplished near the end of the PSN implementation phase. It will be an inspection activity to gain consensus of the involved FAA offices that the NADIN II PSN implementation has been completed in accordance with applicable standards and specifications, and that the PSN equipment is capable of providing the services required within established standards and tolerances.

b. Procedures and Participants. Procedures and participants in the JAI are described in Order 6030.45, Facility Reference Data File. The acceptance of the NADIN II PSN implementation at the sites by the Airway Facilities sector personnel will be

completed by a JAI. The JAI will document the status of the successful delivery, installation and site installation testing of the PSN equipment, acceptance of maintenance responsibilities, and custodianship for the equipment by the sector. The JAI for a site will be performed when the PSN is fully installed at all sites and is providing all of its intended functions as a totally integrated network in the NAS.

c. Partial JAI. Preparations leading to the partial JAI for a site will include:

(1) Inspection and inventory of contractual deliverables to the site.

(2) Completion of site installation and specified site installation testing.

(3) Correction of all identified discrepancies or uncompleted items from the site installation and site installation testing.

(4) Review of the JAI report forms (FAA Forms 6030-18 through 6030-25).

(5) Notification of the joint acceptance board to convene.

d. Final JAI. Preparations leading to the final JAI for a site will include:

(1) Completion of the system level PSN CAI.

(2) Acceptance of the NADIN II PSN equipment by the FAA.

(3) Correction of all identified discrepancies or uncompleted items from CAI, FAA integration testing, and FAA shakedown testing.

(4) Review of the partial JAI report forms (FAA Forms 6030-18 through 6030-25) for completeness.

(5) Notification of the Joint Acceptance Board to convene.

e. Joint Acceptance Board. The Joint Acceptance Board assembled to complete the final JAI for NADIN II PSN will be chaired by an Airway Facilities representative designated by the sector. Board members will include:

(1) ANC-800 representatives.

- (2) Airway Facilities sector personnel.
- (3) Regional Airway Facilities division representatives.
- (4) Regional Air Traffic division representatives.
- (5) Representatives from FAA headquarters, the regions, and the FAA Technical Center, when they so elect.

f. Joint Acceptance Board Task. The task of the Joint Acceptance Board is to determine if the NADIN II PSN is completed in accordance with national criteria and if the PSN is capable of performing its required functions. FAA Forms 6030-18 through 6030-25 will be used to document all findings of the board. In addition, the board will determine the date on which the PSN will be ready to be placed into operational use in the National Airspace System.

87.-89. RESERVED.





## CHAPTER 9. INTEGRATED LOGISTICS SUPPORT

90. **MAINTENANCE CONCEPT.** The Associate Program Manager for Logistics (APML), NAILS Planning and Implementation Programs Branch (ANS-420), is the primary interface point on matters related to system support. The NADIN II project manager (ANC-800) is to coordinate NAILS requirements with the APML to ensure that logistics support requirements and factors are considered during the system design process. Preventive and corrective maintenance actions are to require a minimum of down-time and human involvement through the use of proven techniques. Software maintenance for the NADIN II PSN will be centralized at and controlled by AOS-550.

a. **Site Maintenance.** An Airway Facilities (AF) technician will accomplish preventive and corrective (identify, remove, and replace Line Replaceable Units (LRU)) maintenance tasks on-site. No LRU repair will take place below FAA Depot level. Faulty LRU's will be returned to the FAA Logistics Center for exchange and repair (E&R).

b. **Depot-level Maintenance.** The FAA Logistics Center will manage the FAA's E&R program, and the depot-level contractor repair service contract. Seven 1-year contractor repair options are available in the contract and include emergency repair (24-hour response), and routine repair (30-day turnaround) of faulty LRU's. The NADIN II project office will be responsible for repair through the first year of commissioned operation; the FAA Logistics Center will be responsible for all NADIN PSN factory repair requirements commencing on October 1, 1994, and continuing for the system life-cycle.

c. **Second Level Support.** AOS-550 will provide technical assistance to NADIN II PSN sites via telephone or onsite visits when required. AOS-550 will have the capability to resolve system-wide problems and to modify MSN/PSN Gateway custom software, system documentation, and handbooks. Contract options are also available for onsite contractor technical assistance to AOS-550.

91. **TRAINING.** The NADIN II PSN contractor is responsible for developing a complete training program for FAA personnel engaged in network operations and network hardware maintenance. Except for the PDS and the MSN/PSN Gateway Subsystems, the NADIN PSN consists primarily of COTS equipment. The contractor is responsible for preparing all training materials in accordance with FAA-STD-028 and conducting an operational tryout class for each course. AHT-400 and AMA-424 validate and approve the

courses. The contract contains options for additional initial classroom training by the contractor that can be exercised by the FAA. The contractor will certify that the graduates of each course are qualified to perform the minimum tasks as specified in the course. The contractor or the FAA Academy will provide training courses listed in a - e, below.

a. NADIN II PSN Overview. NADIN II PSN Overview (correspondence course), will provide an overview of the NADIN II PSN network hardware, software and functional characteristics, and the responsibilities of operators and maintenance personnel. The overview course is a prerequisite for all NADIN PSN training courses. Course graduates will be able to:

- (1) Identify the PSN equipment used in the NADIN II PSN.
- (2) Identify the function(s) of the NCC and PSN and how they are interrelated.
- (3) Describe the assigned responsibilities of all personnel in the operation of the PSN system.
- (4) Describe the hardware and software operational concepts for the NADIN PSN at the system level.

b. Hardware Maintenance. PSN Hardware Maintenance, will provide complete instruction, including hands-on training, for maintenance of all PSN node equipment. The contractor will certify that course graduates are able to:

- (1) Locate and identify all assemblies and subassemblies.
- (2) Perform system power up, power down, start up, start over, recovery, and change of operational modes.
- (3) Analyze and identify problems by interpreting results of functional and diagnostic tests.
- (4) Use functional and flow diagrams, and test equipment, as required to localize malfunctions to the appropriate LRU.
- (5) Perform periodic maintenance as required.
- (6) Remove and replace faulty LRU's.

c. NCC Hardware Maintenance. NCC Hardware Maintenance, will provide complete instruction, including hands-on training, for site maintenance of all NADIN PSN equipment located at an NCC. The PSN Hardware Maintenance Course is a prerequisite to this

course. The contractor will certify that course graduates are able to:

- (1) Locate and identify all assemblies and subassemblies.
- (2) Perform system power up, power down, start up, start over, recovery, and change of operational modes.
- (3) Perform configuration and reconfiguration in accordance with system requirements.
- (4) Analyze and identify problems by interpreting results of functional and diagnostic tests.
- (5) Use functional and flow diagrams, and test equipment, as required to localize malfunctions to the appropriate LRU.
- (6) Remove and replace faulty LRU's.

d. NCC Operations. NCC Operations, will provide complete instruction, including hands-on training, for operation and control of the NADIN II PSN from the NCC. The contractor will certify that course graduates are able to:

- (1) Perform system start up, start over, recovery, and change of operation modes.
- (2) Reconfigure user access to the network.
- (3) Remotely modify network databases.
- (4) Reconstruct events after interruptions.
- (5) Mount, dismount, and archive magnetic tapes and disks.
- (6) Operate the system line printer.
- (7) Identify and execute system commands, configurations, and input messages.
- (8) Interpret error messages and take appropriate corrective action.
- (9) Analyze system performance and adjust the network parameters to optimize network efficiency.

e. Attrition Training. The FAA Academy will develop a plan for attrition training using contractor-provided documentation. AHT-400 and ASM-250 will initiate action to implement the FAA

attrition training program for the NADIN PSN.

92. SUPPORT TOOLS AND TEST EQUIPMENT. Special test equipment is located at the FAA Technical Center and the FAA Academy. This equipment consists of Hewlett Packard Idacom protocol analyzers, Unisync Stressters, and Hughes Network Systems Loadgen traffic generators. The Idacoms are used to test subscriber interface with the NADIN II PSN to ensure compatibility. The Stressters and Loadgens generate traffic data which is used to test network operation. No special support tools are required for network implementation.

93. SUPPLY SUPPORT. NADIN PSN supplies and material required for maintenance are to be stored on site and at the FAA Logistics Center. The NADIN PSN contractor provided the Government with a recommended list of site and contractor depot-level spares. A Parts Provisioning Conference was held at the FAA Academy December 8-10, 1992. The contractor's recommendations for parts provisioning were discussed at this conference, and a Parts Provisioning List (PPL) was approved. The Government will proceed to order FAA Logistics Center depot-level spares according to the PPL. Depot level LRU repair support will be provided initially by the contractor; the FAA Logistics Center will assume this support responsibility on October 1, 1994.

a. Site Spares. The Parts Provisioning Conference was successfully completed, and the contractor has shipped spares directly to the PSN sites. The FAA Logistics Center will prepare and disseminate the initial supply support allowance (ISSAC).

b. Depot Stocks. FAA Logistics Center will support the NADIN PSN sites by functioning as the source for E&R and replenishment stocks. FAA Logistics Center will also stock parts/LRU's not authorized to be stocked at the sites (e.g., high mean-time-between-failure rates, high cost, limited availability, etc.) but which are critical to satisfying the required operational availability of the NADIN PSN system; and will support FAA Logistics Center maintenance activities with parts/LRU's.

94. VENDOR DATA AND TECHNICAL MANUALS. The NADIN II PSN contractor is responsible for developing and providing the following:

a. Development Documentation.

- (1) Management plan.
- (2) Program status report.

- (3) Conference agenda
- (4) Conference minutes.
- (5) Software development plan.
- (6) Configuration status accounting reports.
- (7) Configuration management plan.
- (8) FCA/PCA audit plan.
- (9) Review minutes.
- (10) System problem reports.
- (11) System description document.
- (12) Requirements traceability matrix.
- (13) Software requirements specification.
- (14) Interface requirements specification.
- (15) Software top-level design document.
- (16) Verification requirements traceability matrix.
- (17) Master test plan.
- (18) Test plans (per CDRL).
- (19) Software test plan.
- (20) Interface control document.
- (21) Software detailed design document.
- (22) Firmware support manual.
- (23) Interface design document.
- (24) Equipment interface document.
- (25) Test procedures (per CDRL).
- (26) Software test description.
- (27) Computer system operator's manual.

- (28) Computer system diagnostic manual.
- (29) Software user's manual.
- (30) Software programmer's manual.
- (31) Instruction books. (System Level Instruction Book)
- (32) Software test procedure.
- (33) Software test report.
- (34) Version description document.
- (35) Test reports (per CDRL).
- (36) Engineering change proposals.
- (37) Reliability and maintainability program plan.
- (38) Reliability and maintainability status reports.
- (39) Failure summary and analysis report.
- (40) System reliability and maintainability report.
- (41) Software product specification.

b. Installation Documentation.

- (1) Master installation plan.
- (2) Telecommunications system (site) installation plan.
- (3) Installation planning reports.
- (4) As-built site installation drawings.

c. Logistics and Training Documentation.

- (1) Integrated support plan.
- (2) Logistics Support Analysis Record (LSAR) incremental delivery.
- (3) Instructor lesson plans for training courses.
- (4) Provisioning screening data.
- (5) Task analysis.

- (6) Contract training plan.
- (7) Course design guide.
- (8) Supplementary provisioning technical documentation.
- (9) Tests for measurement of student achievement.
- (10) Student's guide and documentation.
- (11) Curriculum and instructional media materials.
- (12) End of course evaluation form.
- (13) Certificate of training.
- (14) Class roster.
- (15) Concepts examination.
- (16) Performance evaluation.
- (17) Repair level analysis reports.
- (18) Post production support plan.
- (19) Supportability assessment plan.
- (20) Supportability assessment report.
- (21) Cumulative repair report.
- (22) Correspondence study materials.
- (23) Reprocurement data.

d. Provisioning Technical Documentation. The NADIN II PSN contractor is responsible for developing and maintaining an LSAR database from which the project office can produce the provisioning reports and lists identified below, as well as other LSA reports. Data is to be provided by the PSN contractor in LSA-061 master file formats via magnetic tape.

- (1) Long lead time items list.
- (2) Tools and test equipment list.
- (3) Provisioning parts list.
- (4) Common and bulk items list.

- (5) Post conference list.
- (6) Repairable items list.
- (7) Design change notice.

e. Supplementary Provisioning Technical Documentation. This documentation consists of data such as specifications, standards, drawings, photographs, sketches, descriptions, assembly and general arrangement drawings, schematic diagrams, and wiring and cabling diagrams needed to indicate the physical characteristics, locations, and function of the item. This is an option that may be requested when needed.

95. EQUIPMENT REMOVAL. Not Applicable. No FAA equipment is being displaced by the NADIN II PSN.

96. FACILITIES. NADIN II PSN hardware is configured to fit within existing facilities.

97. SOFTWARE MAINTENANCE. AOS-550 will assume responsibilities for the NADIN II software maintenance and enhancements upon receipt of appropriate documentation from the PSN contractor after JAI.

98.-99. RESERVED.



## CHAPTER 10. ADDITIONAL PROJECT IMPLEMENTATION ASPECTS

100. CONFIGURATION MANAGEMENT. Configuration management of the NADIN PSN during the acquisition and implementation phases includes the following:

a. Acquisition Configuration Management. The contractor is responsible for establishing, implementing, and maintaining a configuration management program for the NADIN PSN. In support of the configuration management program, the contractor is responsible for implementing and maintaining an internal configuration status accounting system. The contractor has prepared a configuration management plan in accordance with FAA-STD-021 and augmented by MIL-STD-483, and a software configuration management plan in accordance with DOD-STD-2167.

b. Implementation Configuration Management. AOS-550 in coordination with ASM-300, will assume the responsibility for maintaining the operational NADIN PSN baseline configuration, per Order 1320.48. Guidance and procedures in Order 1800.8, National Airspace System Configuration Management, will be followed to ensure a smooth and efficient transfer between the project office and system maintenance. ANC-400 and ASM-300 will develop a handoff agreement concerning the network management transition.

101.-109. RESERVED.



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APPENDIX 1

**APPENDIX 1. CONTACT LIST FOR NADIN II PSN  
PROJECT MANAGEMENT PERSONNEL**

<b>ORGANIZATION</b>	<b>TITLE</b>	<b>ROUTING</b>	<b>NAME/ADDRESS/TELEPHONE</b>
<b><u>ALASKAN REGION</u></b>			
Alaskan Regional HQ	APM	AAL-450	Jerry Jensen 222 W. 7th Avenue Box 14 Anchorage, AK 99513 (907) 271-5222
<b><u>CENTRAL REGION</u></b>			
Central Regional HQ	APM	ACE-428A	Eric Wood 601 East 12th Street Kansas City, MO 64106 (816) 426-3601
<b><u>EASTERN REGION</u></b>			
Eastern Regional HQ	APM	AEA-452.2	Phil Harper Fitzgerald Fdrl. Bldg. Bldg. 111 Jamaica, NY 11430 (718) 553-1176
<b><u>FAA ACADEMY</u></b>			
Mike Monroney Aeronautical Center	ACOTR/ Training	AMA-424	Nell Harrison P.O. Box 25082 Oklahoma City, OK 73125 (405) 954-4927
<b><u>FAA LOG. CENTER</u></b>			
Mike Monroney Aeronautical Center		ALM-700	E. K. Reed FAA Headquarters Bldg. 800 Independence Ave. SW Washington, DC 20024 (202) 267-7432

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ORGANIZATION	TITLE	ROUTING	NAME/ADDRESS/TELEPHONE
<b><u>FAA TECH CENTER</u></b>			
Operational Support Service	APM	AOS-550	Larry Sanders Atlantic City Int Arpt Atlantic City, NJ 08405 (609) 485-6799
Eng. Integration & Operational Eval. Service	APMT	ACW-400B	Paul Dever Atlantic City Int Arpt Atlantic City, NJ 08405 (609) 485-5866
<b><u>GREAT LAKES REGION</u></b>			
Airway Facil. Div.	APM	AGL-421.8	Jane Montgomery 2300 East Devon Avenue Des Plaines, IL 60018 (708) 694-7760
<b><u>NEW ENGLAND REGION</u></b>			
New England Regional HQ	APM	ANE-420	John Pallera 12 New England Executive Park Burlington, MA 01803 (617) 270-2482
<b><u>NORTHWEST MTN. REGION</u></b>			
Northwest Mountain Regional HQ	APM	ANM-422E3	Bob Rollins 1601 Lind Ave. SW Renton, WA 98055-4056 (206) 227-2408
<b><u>SALT LAKE CITY (NADIN)</u></b>			
NAWPF Bldg.	MGR	NADIN SFO	Dale Draper SLC NADIN SFO 2150 West 700 North Salt Lake City, UT 84116 (801) 539-3160

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ORGANIZATION	TITLE	ROUTING	NAME/ADDRESS/TELEPHONE
<b><u>QUALITY ASSURANCE</u></b>			
FAA National HQ	MGR	ASU-420	Ken Leanger 800 Independence Ave. SW Washington DC 20591 (202) 267-8906
Government Quality	QRO	ASU-426	Gerry Patenaude P.O. Box 91000 Melbourne, FL 32902 (407) 984-5542
<b><u>SOUTHERN REGION</u></b>			
Southern Regional HQ	APM	ASO-420A	Eric Mumm (NISC) P.O. Box 20636 Atlanta, GA 30320 (404) 763-7677
<b><u>SOUTHERN REGION</u></b>			
Atlanta (NADIN) NAWPF Bldg.	MGR	NADIN SFO	Wayne Rives Atlanta NADIN SFO 299 Woolsey Rd. Hampton, GA 30228 (404) 946-7671
<b><u>SOUTHWEST REGION</u></b>			
Southwest Regional HQ	APM	ASW-422.3	Chuck Morrow 4400 Blue Mound Road Ft. Worth, TX 76193-0422 (817) 740-3491
<b><u>WESTERN-PACIFIC REGION</u></b>			
Western-Pacific Regional HQ	APM	AWP-422.32	George Pineda P.O. Box 92007 Worldway Postal Center Los Angeles, CA 90009 (310) 297-1494











